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THE DIPLOPTEROUS WASPS OF FABRICIUS, IN THE BANKSIAN COLLECTION AT THE BRITISH MUSEUM

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During a recent visit at the British Museum, I was able to examine the diplopterous wasps of the Banksian Collection, which (it is well known) contains many of the types described by Fabricius. Owing to lack of time, some of the specimens could not be studied as completely as might be desired. Yet I believe that the following notes will elucidate several critical points.

As far as I know, the only reference in print to the Diploptera of the Banksian Collection, is H. de Saussure's brief account in the third part of his monograph (1856, *Etudes Fam. Vespides*, III, Suppl., pp. 106-107). His examination appears to have been quite hurried and he does not seem to have compared specimens of his own species. In the present paper, I have noted in each case whether or not de Saussure's conclusions agreed with mine. A few of the specimens were later examined by the late G. Meade-Waldo, and his results were published in sundry papers. Sometimes they were merely incorporated in his arrangement of the general collection at the British Museum.

For the convenience of the taxonomist, I have divided the species studied into three groups. Otherwise I have followed the sequence of the collection in its present condition. It appears to have been arranged by Frederick Smith, shortly after it was deposited in the British Museum. The references to Fabricius' works are abbreviated to the year of publication, followed by the page:

1775: Systema Entomologiae.

1781: Species Insectorum, I.

1787: Mantissa Insectorum, I.

1793: Entomologia Systematica, II.

Unless otherwise stated, the specimens bear no locality labels. With few exceptions, they are remarkably well preserved.

Of the several wasps described by Fabricius from the Banksian Collection, the only species not represented at the British Museum is *Vespa cinerea* Fabricius, 1793, II, p. 279. This is a synonym of *Belonogaster junceus* (Fabricius) and appears to have been based upon the same specimen as *Vespa juncea* Fabricius.

I. TRUE TYPES OF DIPLOPTERA DESCRIBED BY FABRICIUS.

1. *Vespa ephippium* Fabricius, 1775, p. 362=*Abispa ephippium* (Fabricius). The holotype is a female.¹

2. *Vespa analis* Fabricius, 1775, p. 363. The holotype is a female.

3. *Vespa arenaria* Fabricius, 1775, p. 365. The species is there described from "Mus. Banks" and the specimen in the collection fits the description exactly. This holotype is a small worker, with long oculo-malar space, and nothing but the common North American species, which H. de Saussure described as *Vespa diabolica*. Fabricius' name has priority. R. du Buysson [1905, Ann. Soc. Ent. France, LXXIII, (1904), p. 571] first suggested the possible identity of *diabolica* with *arenaria*. This identity seems to have been recognized by the late Meade-Waldo also, for, in the general collection at the British Museum, *V. diabolica* de Saussure is placed under the label *V. arenaria* Fabricius.

H. de Saussure (Et. Fam. Vesp., III, p. 107) wrote: "*Polistes arenaria* Fabricius=*Vespa arenaria* ? m." But this was certainly an error. His *Vespa arenaria* he placed in the group of species with "yeux atteignant la base des mandibules" (what is now the subgenus *Vespula* Thomson). Fabricius' *Vespa arenaria* belongs in the subgenus *Dolichovespula* Rohwer.

Vespa arenaria H. de Saussure (1853-1855, Et. Fam. Vesp., II, p. 134) (not of Fabricius) is a synonym of *Vespa communis* H.

¹ According to verbal information received from Mr. R. E. Turner, the Australian insects of the Banksian Collection were all collected during Captain Cook's voyage, while his ship was being repaired on the coast of Queensland, at a place now called Cookstown.

de Saussure (1857, Stettin. Ent. Zeitg., XVIII, p. 117). That name being preoccupied by *Vespa communis* Schrank (1785, Neue Mag. Lieb. Ent., II, p. 328), the next available name for this common yellow-jacket of eastern North America is *Vespa maculifrons* R. du Buysson (see Rohwer, 1926, Proc. Ent. Soc. Washington, XXVIII, pp. 93-94).

4. *Vespa aestuans* Fabricius, 1781, I, p. 462=**Synagris aestuans** (Fabricius). The holotype is a female.

5. *Vespa haemorrhoidalis* Fabricius, 1775, p. 366=**Odynerus (Rygchium) haemorrhoidalis** (Fabricius). The holotype is a female.

6. *Vespa albifrons* Fabricius, 1775, p. 366=**Paralastor albifrons** (Fabricius), as recognized by H. de Saussure (Et. Fam. Vesp., III, p. 335). The holotype is a male. This appears to be a species of *Paralastor* differing from any of those studied by R. C. L. Perkins (1914, Proc. Zool. Soc. London, pp. 563-624; and 1914, Ann. Mag. Nat. Hist., (8) XIV, pp. 235-240).

7. *Vespa rufipes* Fabricius, 1775, p. 367=**Odynerus (Rygchium) rufipes** (Fabricius). The holotype is a female. The species was correctly recognized by H. de Saussure.

8. *Vespa tecta* Fabricius, 1781, I, p. 466=**Odynerus (Rygchium) tectus** (Fabricius). The holotype is a female.

This insect agrees structurally with *Odynerus (Rygchium) rhynchoides* H. de Saussure (1852, Et. Fam. Vesp., I, p. 174, male; Senegal), which I must regard as a color phase of *O. tectus*.

The type of *Vespa tecta* shows the following morphological peculiarities: Clypeus pyriform in outline, but more narrowed toward the apex than in *Odynerus falcatus* Tullgren; covered with heavy, irregular, longitudinal striae, among which are scattered deep punctures. Thorax, seen from above, much longer than wide. Mesonotum without carinae. Postscutellum without projecting spines or tubercles; its vertical and horizontal portions separated by an arcuate, quite blunt ridge, which is finely crenulate. No horizontal area behind the postscutellum.

Propodeum: superior ridges very high, sharp, translucent, separated from the postscutellum by a deep notch, where the lamella of the superior ridge ends in a pointed angle; lateral angles quite prominent, tooth-like, but with blunt apex; lateral and inferior ridges well marked, but not lamelliform; concavity transversely striate; dorsal areas almost wholly covered with very large punctures.

tures. Second abdominal sternite uniformly and moderately convex in profile, with a brief, shallow, but distinct, longitudinal furrow at base. First and second abdominal tergites almost uniformly covered with scattering, medium-sized punctures; they are somewhat denser on the slightly depressed, apical third of the second tergite, as well as on the succeeding tergites. The size is approximately that of *O. rhynchoides*.

The pattern of Fabricius' type is much the same as that of *O. rhynchoides*, but the yellow color is replaced by ferruginous. The abdomen is ferruginous above, except for the black base and a broad, median, black stripe over the dorsum, the stripe expanded to the sides over the basal fourth of the second tergite (thus forming a black cross). The wings are almost wholly violaceous black, with ferruginous costa, thus differing conspicuously from those of *O. rhynchoides*.

In Meade-Waldo's key to the Ethiopian species of *Odynerus* [1915, Trans. Ent. Soc. London, (1914), p. 494], there are two important errors with regard to *O. tectus*. The description of the color pattern is misleading. Furthermore the species is placed among those having "no fissure separating median segment from postscutellum"; *O. rhynchoides* being inserted under the clause: "Upper angles of median segment separated from sides of postscutellum by a distinct fissure." As a matter of fact, in Fabricius' type of *tectus* the notch in question is quite deep and wide and not different from that found in *rhynchoides*.

Between *O. tectus* (Fabricius) (with its var. *rhynchoides* H. de Saussure) and *O. pseudo-lateralis* Meade-Waldo, there are slight morphological differences, which appear to be of specific value. The lateral angles of the propodeum, as well as its lamellate superior ridges differ. Yet these two species certainly are closely related.

9. *Vespa bicincta* Fabricius, 1781, I, p. 465=***Pachymenes bicinctus*** (Fabricius). The holotype is a female. The erroneous locality "Cap bon. sp.," given in the original description explains why this peculiar little wasp has not been recognized thus far. Owing to the narrowed, but short, cup-shaped first abdominal segment, which is distinctly set off from the remainder of the abdomen, this species should be placed in *Pachymenes*.

It has been redescribed three times as new: *Odynerus raro-tongae* Meade-Waldo (1910, Ann. Mag. Nat. Hist., (8) VI, p. 107, female and male; Rarotonga, Cook Islands) and *Odynerus*

sarasini A. v. Schulthess (1915, Nova Caledonia, Zool., II, 1, p. 50, Fig. 2, female; New Caledonia) are synonyms of *Vespa bicincta* Fabricius. According to H. de Saussure, *Odynerus bizonatus* Boisdual (1835, Voyage de l'Astrolabe, Faune Entom. Océan Pacifique, II, p. 658; Tonga-Tabu, Tonga Islands; Atlas, Pl. XII, Fig. 5) likewise is a synonym of *Vespa bicincta*. Certainly the insect described by H. de Saussure (1852, Et. Fam. Vesp., I, p. 156, female and male) as *Odynerus bizonatus* is Fabricius' species. Meade-Waldo recognized that his *O. rarotongae* was a synonym of *Vespa bicincta* Fabricius.

Both structure and coloration are characteristic and are well described by Meade-Waldo and A. v. Schulthess. The body is very smooth, almost impunctate; the propodeum likewise smooth, with all ridges and angles rounded off. Body black, with a number of pale yellow spots on head and thorax (two basal spots on the clypeus; a dot on each outer orbit, above; a spot on each side of pronotum, scutellum and propodeum, making six dorsal spots on the thorax; a spot on each side beneath the base of the wing), and a narrow, continuous, yellow, apical fascia on first tergite and on second tergite and sternite. Legs almost entirely ferruginous. Wings hyaline, the anterior half of fore wing purplish infusate.

10. *Vespa radula* Fabricius, 1787, I, p. 290. Under this name there are in the collection two females, one of which may be Fabricius' true holotype. These specimens, however, are not marked "types." They represent two different species of *Odynerus*, neither of which is known to me.

11. *Vespa lanio* Fabricius, 1775, p. 365 = ***Polistes canadensis*** (Linnaeus), as recognized by H. de Saussure. The holotype is a female from Brazil. This insect appears to be the typical color phase of *P. canadensis*, since it is without yellow markings, and even lacks the apical fascia of the first tergite.

12. *Vespa schach* Fabricius, 1781, I, p. 461 = ***Polistes schach*** (Fabricius). The specimen labelled "type" in the Bankian Collection is a female of "Australia." It is a large, entirely ferruginous brown *Polistes*, with a distinct prepectal suture and an impressed line dividing the mesepisternum. It is an entirely different wasp from *Polistes schach* H. de Saussure (1853-1855, Et. Fam. Vesp., II, p. 50), de Saussure's species being *Polistes confusus* F. Smith. Later, after examining Fabricius' type, H. de Saussure recognized his error and stated that *Polistes schach*

(Fabricius) = *Polistes humilis* H. de Saussure, 1853-1855, Et. Fam. Vesp., II, p. 52 (not *Vespa humilis* Fabricius). At present I regard *P. confusus* as distinct from *P. orientalis* (Kirby).

13. *Vespa humilis* Fabricius, 1781, I, p. 461 = ***Polistes humilis*** (Fabricius). There are two specimens labelled "type," a female and a male, both undoubtedly belonging to the same species. I have seen a number of specimens, agreeing with Fabricius' types, in a collection of insects recently made by Mr. J. G. Myers in New South Wales. There is no prepectal suture and the mesepisternum is not divided by an impressed line. H. de Saussure synonymized his *Polistes tasmaniensis* (1853-1855, Et. Fam. Vesp., II, p. 66, Pl. VI, Fig. 6, female and male; Australia) with *Polistes humilis* (Fabricius), and this appears to be correct. Fabricius' male may be selected as the holotype, since the species of *Polistes* are best characterized in that sex. The female will then be the allotype.

As noted above, *Polistes humilis* H. de Saussure is a different species and a synonym of *Polistes schach* (Fabricius), according to H. de Saussure.

14. *Vespa tepida* Fabricius, 1775, p. 366 = ***Polistes tepidus*** (Fabricius), as recognized by H. de Saussure. The holotype is a female. It agrees with the current idea of that Australian species.

15. *Vespa carnifex* Fabricius, 1775, p. 365 = ***Polistes carnifex*** (Fabricius), as recognized by H. de Saussure. The holotype is a female. Structurally this specimen agrees with the current idea of this South American wasp. There is no prepectal suture; but the mesepisternum is completely divided by an impressed line. The oculo-malar space is very long, over one-third the length of the eye. The head is much swollen. The clypeus does not touch the inner orbits.

16. *Vespa marginalis* Fabricius, 1775, p. 367 = ***Polistes marginalis*** (Fabricius), as recognized by H. de Saussure. The holotype is a female and agrees with the current idea of this species.

17. *Vespa variabilis* Fabricius, 1781, I, p. 466 = ***Polistes humilis*** (Fabricius) var. ***variabilis*** (Fabricius). The holotype is a male, which agrees structurally with *P. humilis*. I regard it as a color phase of that species, differing in the abundant yellow markings. H. de Saussure's *Polistes variabilis* (1853-1855, Et. Fam. Vesp., II, p. 66) was described from Fabricius' type and is the same insect.

18. *Vespa macaensis* Fabricius, 1793, II, p. 259 = *Polistes macaensis* (Fabricius), as recognized by H. de Saussure. Two females of the lighter colored form, very abundantly marked with yellow. These specimens are not marked as types, but I believe one of them is the true holotype, since Fabricius described the species from "Mus. Dom. Banks."

19. *Vespa tabida* Fabricius, 1781, I, p. 468 = *Polybioides tabida* (Fabricius). The holotype is a female, which agrees with the current idea of this species. H. de Saussure saw Fabricius' type, when he described *Polybia tabida* (1853-1855, Et. Fam. Vesp., II, p. 209).

20. *Vespa lateralis* Fabricius, 1781, I, p. 466 = *Odynerus (Rygchium) lateralis* (Fabricius). There are two specimens labelled "*Vespa lateralis*" in the Banksian Collection. As pointed out by Meade-Waldo [1915, Trans. Ent. Soc. London (1914), p. 512], H. de Saussure selected as "type" the wrong specimen, which does not agree in size with Fabricius' original description. The true holotype is a female agreeing with my description of *Odynerus lateralis* (1918, Bull. Amer. Mus. Nat. Hist. XXXIX, p. 180). *Odynerus truncatus* H. de Saussure (1852, Et. Fam. Vesp., I, p. 175, female and male) is a synonym.

I had also regarded *Rygchium furax* Kohl (1894, Ann. Naturh. Hofmus. Wien, IX, p. 339, female and male), as being the same species; but a female received from the Vienna Museum under this name differs in a number of morphological details. This specimen, however, came from Senegal and therefore was not part of the original lot, which included specimens from Gaboon and Khartoum. If the Senegal female is correctly identified, *Odynerus (Rygchium) furax* (Kohl) is more closely allied to *O. angolensis* Radoszkowsky (as redescribed by me in 1918) than to *O. lateralis* (Fabricius), although conspicuously different in coloration. The first abdominal tergite is almost impunctate, bearing but very few, exceedingly fine punctures. On the second tergite the punctures are more numerous, though still scattering and shallow; they are found all over the tergite, but are farther apart on the median, anterior area. Clypeus, front, and vertex are dull, but show exceedingly sparse and fine punctures. The apex of the clypeus is deeply, semi-circularly emarginate, with sharp carinate lateral angles. The surface of the clypeus is but slightly uneven. Fovea of the vertex small, shallow, bare, smooth and shiny. Puncturation of

pronotum and mesonotum shallow and remote, though more abundant than on the vertex; the surface of these parts dull. Postscutellum divided into two broad lobes, separated by a shallow depression, and crenulate-denticulate along the raised edge. Second sternite broadly flattened, the basal three-quarters slightly concave in the middle and with a mere trace of longitudinal groove at the base.

The second, more robust, specimen placed in the Banksian Collection under *Vespa lateralis*, is a female with the anterior portion of the thorax smooth and shiny. It belongs to *Odynerus* (*Rygchium*) *marginellus* (Fabricius) (= *Vespa africana* Fabricius, 1804, Syst. Piezat., p. 257; *Rhygchium laterale* H. de Saussure, 1856, Et. Fam. Vesp., III, p. 171; *Rygchium africanum* H. de Saussure, 1852, Et. Fam. Vesp., I, p. 108). Fabricius described his *Vespa marginella* (1793, II, p. 263), from a specimen in the Banksian Collection, but at present there is no longer any specimen in that collection labelled "*marginella*." I suggest that the larger of the two specimens labelled "*Vespa lateralis*" was originally the type of "*Vespa marginella*," but was inadvertently provided with a wrong label.

21. *Vespa macilenta* Fabricius, 1781, I, p. 466 = **Belonogaster** sp. The holotype is a male. R. du Buysson (1909, Ann. Soc. Ent. France, LXXVIII, p. 247) regarded this as a synonym of *Belonogaster griseus* (Fabricius), but he did not see Fabricius' type. He appears merely to have followed H. de Saussure, who identified the type of *V. macilenta* with *Belonogaster rufipennis* H. de Saussure. The specimen seems to be rather too small and too slender for *B. griseus*. It should be compared with several other described species of *Belonogaster*.

22. *Vespa grisea* Fabricius, 1775, p. 372 = **Belonogaster griseus** (Fabricius). The holotype is a female agreeing with the current idea of the species. H. de Saussure recognized that it was the wasp which he described as *Rhaphigaster rufipennis* (1853-1855, Et. Fam. Vesp., II, p. 15, Pl. II, Fig. 6).

23. *Vespa juncea* Fabricius, 1781, I, p. 468 = **Belonogaster junceus** (Fabricius). The holotype is a female agreeing with the current idea of the species.

24. *Vespa cyanea* Fabricius, 1775, p. 372 = **Synoeca cyanea** (Fabricius). A female not marked as type, but which I believe is the holotype, since the species was described from "Mus. Banks."

25. *Vespa petiolata* Fabricius, 1781, I, p. 467 = **Eumenes pyriformis** (Fabricius). A male, which is not marked as type, but which I regard as the holotype, since *V. petiolata* was described from "Mus. Dom. Banks." I follow W. A. Schulz (1912, Berlin. Ent. Zeitschr., LVII, p. 88) in regarding *Vespa pyriformis* Fabricius, 1775, p. 371, as conspecific with *V. petiolata* Fabricius.

26. *Vespa campaniformis* Fabricius, 1775, p. 371 = **Eumenes campaniformis** (Fabricius). The holotype is a female. It agrees with my idea of the typical form of that species (1926, Ann. South Afric. Mus., XXIII, 3, p. 541). H. de Saussure referred it to *Eumenes esuriens* (Fabricius), which is a color phase of *Eumenes campaniformis*.

27. *Vespa arcuata* Fabricius, 1775, p. 371 = **Eumenes arcuatus** (Fabricius). The holotype is a female agreeing with the current idea of the species, as recognized by H. de Saussure.

II. DIPLOPTERA NOT OR APPARENTLY NOT TYPES OF FABRICIAN SPECIES.

28. *Vespa cornuta* Fabricius, 1775, p. 363 = **Synagris cornuta** (Linnaeus). A male.

The reference to *Systema Piezatorum* (1804, p. 252) given in a former paper (1918, Bull. Amer. Mus. Nat. Hist., XXXIX, p. 326) should be corrected, since in that work the species is described as *Synagris cornuta*.

29. *Vespa crabro* Fabricius, 1775, p. 364 = **Vespa crabro** Linnaeus. A female.

30. *Vespa vulgaris* Fabricius, 1775, p. 364 = **Vespa vulgaris** Linnaeus. A female.

31. **Vespa cincta** Fabricius, 1775, p. 362. The specimen labelled "type" in the Banksian Collection is a female; but it is not the true holotype, since it was described by Fabricius as a variation of *V. cincta*: "Varietas minor thorace immaculato, e Capite Bonae Spei. Mus. Banksianum."

32. *Vespa maculata* Fabricius, 1775, p. 364 = **Vespa maculata** Linnaeus. A worker.

33. *Vespa calida* Fabricius, 1775, p. 366 = **Odynerus (Rygchium)** sp. with the type of coloration exhibited by *Synagris calida* (Linnaeus). A female. According to H. de Saussure it is

Synagris minuta H. de Saussure (= *Synagris abyssinica* Guérin), but I cannot agree with this identification.

34. *Vespa uncinata* Fabricius, 1775, p. 367 = **Monobia quadridens** (Linnaeus). A male and a female, which agree perfectly with Fabricius' original description.

35. *Vespa parietum* Fabricius, 1775, p. 368 = **Ancistrocerus** sp., related to *A. callosus* (Thomson). A female.

36. *Vespa spinipes* Fabricius, 1775, p. 368 = **Ancistrocerus** sp., related to *A. callosus* (Thompson). A male.

37. *Vespa bidens*? Fabricius, 1775, p. 368 = **Ancistrocerus** sp. A male.

38. *Vespa annularis* Fabricius, 1775, p. 366 = **Polistes annularis** (Fabricius). Two females, which are not the types.

39. *Vespa gallica* Fabricius, 1781, I, p. 460 = **Polistes gallicus** (Fabricius). A female, which is not the type.

40. *Vespa coarctata* Fabricius, 1775, p. 370 = **Zethus** sp. A female, not marked as type. It is not *Vespa coarctata* Linnaeus. According to H. de Saussure, Fabricius' specimen is *Zethus pyriformis* H. de Saussure.

III. NON-DIPLOPTEROUS WASPS DESCRIBED BY FABRICIUS AS *Vespa*.

41. *Vespa tricineta* Fabricius, 1775, p. 363 = **Sphecius speciosus** (Drury, 1773). The holotype is a female.

42. *Vespa concinna* Fabricius, 1775, p. 367 = **Hylaeoides concinnus** (Fabricius), as recognized by H. de Saussure. A female, which appears to be the holotype, although it is not marked as type in the collection.

43. *Vespa serripes* Fabricius, 1781, I, p. 464 = **Cerceris serripes** (Fabricius), as recognized by H. de Saussure. The holotype is a male. As pointed out to me by Mr. R. E. Turner, this is the common North American species subsequently described by Guérin-Meneville as *Cerceris bicornuta* (1845, Iconogr. Règne Anim., VII, Insect., p. 443). There appears to be no reason why Fabricius' earlier name should not be used for this wasp.

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